

Problem 5: AUTOMATED DATA COLLECTION FROM A FOOTBALL VIDEO

Industry: Sports

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Problem Statement

Data is playing an increasingly important role in sports. Good data assist a scout to choose the most promising candidates for potential recruitment, a coach to focus on the right player combinations and training schedule for his team, a player to better understand and improve his strengths and weaknesses, an advertiser to determine which players on the field generate more crowd and viewer activity, and a betting house to fine tune the odds in advance of a game. Data driven decision making has revolutionized baseball in the USA, and plays a significant role in many other sports. In football, the vital statistics and running distances of players are monitored by devices worn on their bodies, and most games generate several independent streams of video footage from different cameras. The German football team that won the 2014 World Cup used SAP software to analyze their games as well as those of their opponents. The software suggested combinations and moves that would be most likely to succeed against their upcoming opponents and helped monitor training sessions. Collecting and curating quality data from a football match is therefore clearly of immense value for a team and other stakeholders.

The data typically collected from a football game includes goals scored, assists, number of shots at goal, possession information, corners, offsides, fouls, cards given, injuries, substitutions and sometimes the running distance of each of the players. There is scope for the collection of larger data sets, such as the position-per-time of the ball and each player on the field throughout the game, or detailed information on player posture throughout the game. Higher level information such as player sprint speeds, passing, etc. could be derived from these data sets and all of the above ‘small’ statistics could also be calculated.

Isazi Consulting has engaged with a number of local football clubs who have expressed interest in making use of detailed data to aid in decision making, with an aim to employing sophisticated methods to mine this data and generate insights. There is therefore

some appetite in the local market for the lower level detailed data of the kind described in the previous paragraph. We are interested in assessing the viability of collecting such data from the video feed of a match.

Given the video footage of a football game, what can be inferred about the position of the soccer ball and players on the field as a function of time? We are interested in the following outcomes from the Study Group:

- What image processing and video processing methods are available in the literature for identifying and tracking objects in video?
- What methods are available in the literature for detecting a sudden switching of cameras?
- What existing research is available on mapping something from a video into real 3D coordinate space?
- Is it possible to identify and track the soccer ball consistently throughout a game simply from the published footage of that game?
- If several camera feeds are made available for a game, does this improve the ability to track the ball?
- Is it possible to map the coordinates of the ball into real 3D or 2D “field” space?
- Is it possible to track players in the game from the video feed alone?
- What methods are most successful at tracking players/balls in a football match?

Some match data will be made available for the Study Group.